L 38436-66 EWT(m)/EWP(k)/EWP(e)/EWP(t)/ETI IJP(c) JG/WW/JD

ACC NR: AP6024389 SOURCE CODE: UR/0020/66/169/002/0316/0319

AUTHOR: Andrianov, V. V.; Zenkevich, V. B.; Sokolov, V. I.; Sychev, V. V.; Tovma, V. A.; Fedotov, L. N.

ORG: Scientific Research Institute for High Temperatures (Nauchno-issledovatel'skiy institut vysokikh temperatur); Central Scientific Research Institute for Ferrous Metallurgy im. I. P. Bardin (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)

TITLE: A superconducting solenoid from a three-component alloy generating fields of over 75,000 Oe

SOURCE: AN SSSR. Doklady, v. 169, no. 2, 1966, 316-319

TOPIC TAGS: superconductivity, strong magnetic field, niobium alloy, titanium alloy, zirconium containing alloy, SOLENOID

ABSTRACT: A superconducting magnet has been constructed which generates magnetic fields of more than 75,000 oe using wire made from an alloy of niobium (65%), titanium (15%), and zirconium (about 9%), the remainder being other components selected for their metallurgical properties. The critical temperature of the material is 9.8—10K. Because of its relatively low brittleness, the 0.25-mm o.d. copper-plated wire could be drawn by standard methods into four-kg coils

UDC: 537.312.62

Card 1/2

L 38436-66
ACC NR: AP6024389

representing a total length of 12 km. After cold working in vacuum or in a helium atmosphere, both types of wire were coated with a polyester varnish to add a 0.03-mm layer to the diameter. The magnet, with a 16-mm inner diameter, consisted of 3 concentric sections wound onto aluminum-alloyed formers. The inner section alone, using 17,762 turns of vacuum cold-worked wire, generated 65,000 oe; the two other sections made of 15,210 and 10,480 turns of wire cold-worked in a helium atmosphere, and wound on a common former, generated 43,500 oe. The maximum magnetic-field intensity of the magnet was 76,300 oe. Even though the solenoid has been repeatedly driven normal, no damage has been observed. Orig. art. has: 4 figures. [ZL]

SUB CODE: 20/ SUBM DATE: 16Apr66/ OTH REF: 001/ ATD PRESS: 5042

Card 2/2

ZAMYATIN, S.I.; SYCHEV, V.N.

Mud lakes and sites having therapeutic value in Kustanay Province.
Trudy Inst. kraev.pat. AN Kazakh. SSR 7:21-32 '59. (MIRA 13:3)
(KUSTANAY PROVINCE--BATHS, MOOR AND MUD)

PA-26T97

USSR/Physics
Sparks, Electric
Spectroscopy

Dec 1946

"Spectral Excitation in Spark Discharges Between Briqueted Electrodes," V. P. Sychev, 6 pp

"Zhur Tekh Fiz" Vol XVI, No 10

Determined a method for utilizing materials pressed out of powdered ore for spectral analysis of electrodes, when a spark discharge serves as the source of light. Established the advantage of this method of analysis over the older method of filling carbon electrodes with materials of sufficient electro-conductivity. Determined optimum methods for the

ID USSR/Physics (Contd) Dec 1946

preparation and utilization of these electrodes. Submitted at the Siberian Physics and Technical Institute, Laboratory of Spectroscopy, at Tomsk.

ID 26T97

SYCHEV, V. P.

SYCHEV, V. P.

PA 24T94

USSR/Physics
Arcs
Electrodes

May/Jun 1947

"Concentration and Distribution of Electrode Matter in Arc and Spark Discharges," H. A. Prilezhayeva, N. K. Rubtsova, V. P. Sychev, 6 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XI, No 3

The quantitative juxtaposition of measured distribution of line intensity poses theoretical difficulties, because of the lack of data which might be used in the formula for calculating the rate of departure of the conforming atoms from the source cloud. Stark's widening of zinc lines was not effective as the value of the zinc line was too small to be used in the constant square of Stark's effect. Article submitted at the Siberian Physico-Technical Institute, Tomsk State University imeni V. V. Kuybyshev.

24T94

CA

Effect of pressure on the excitation temperature and on the gas temperature in a discharge intermediate between the silent and the arc type. V. P. Sychev. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 12, 382-5 (1948).—Excitation temps., T_e (see preceding abstr.) were detd. in N_2 under 10–520 mm. Hg, in a 500-v., 200-milliamp. discharge between a W anode and a C cathode covered with $CuSO_4$ mixed with quartz, from the relative intensities of the lines Cu 5153 and Cu 5105 A. In the same discharge, the gas temp., T_g, was detd. by the relative total intensities in the CN band heads ($\Delta v = 0$), with the aid of the data of Brinkman. Detns. at current intensities of 100, 150, and 250 milliamp., and in mixts. of H_2 with N_2 (T_e detd. by the line intensities H 4861.3 and 4340.6 A.), gave identical results. In terms of the pressure p, up to 500 mm. Hg, T_e increases with p, whereas T_e passes through a min. at about 200 mm. Hg. Depending on the p range, the discharge is of the silent type below 30 mm. Hg, predominantly silent with only occasional appearance of an arc between 30 and 50 mm., and partly silent, partly arc between 50 and 200 mm. The electrodes become incandescent only above 200 mm. Hg. Up to 200 mm., the majority of the electrons dissipate their energy in the form of thermal energy of the gas, and T_e decreases to a min.; the subsequent increase of T_e is detd. by an increase of the col in the arc. N. Thon

SYCHEV, V. P.

USSR/Physics — Jul/Aug 48
Plasma
Gas Discharge

"Study of the 'Excitation Temperature' and the Gas Temperature as a Function of the Pressure in an Intermediate Type Discharge Between Glowing and Arcing, V. P. Sychev, Siberian Physicotech Inst, Tomsk State U imeni V. V. Kuybyshev, 4 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XII, No 4

Studied discharge in the transition from glow to arc and established pressure boundary corresponding to equilibrium temperature by comparing "excitation temperature" with gas temperature. Studied discharge in

[redacted] 53/49T96

USSR/Physics (Contd) Jul/Aug 48

nitrogen at pressures of 10-520 mm Hg in intervals of 20-30 mm with a current of 200 ma. Found that thermodynamic equilibrium occurs only at rather high pressures in the order of 0.5 atm.

[redacted] 53/49T96

Method for spectroscopic determination of silver in in- dustrial [illegible] *Trudy* [illegible] *Referat.* [illegible] [illegible] As [illegible] The elec- trodes [illegible] The spect[illegible] was a ISP-22, the films were "Isoortho." They were developed in metholhydroquinone developer and compared on a MF- microphotometer. Standards contg. 0.001–0.1% Ag were prepd. by adding a $AgNO_3$ soln. to a concentrate or to a blue [illegible]. The error of this method is estd. at 15–20%.

M. Hosch

SOV/139-58-6-9/29

AUTHOR: Sychev, V.P.

TITLE: Dependence of the Intensity of Nitrogen Bands in a Mixture with Argon on the Electron Temperature in a Glow Discharge (Zavisimost' intensivnosti polos azota v smesi s argonom ot elektronnoy temperatury v tleyushchem razryade)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika, 1958, Nr 6, pp 60-65 (USSR)

ABSTRACT: Changes of partial pressures in a mixture of gases alter the electron temperature in a glow discharge; this alters the relative intensity of the molecular bands. The present paper deals with the relative intensity of the bands of the First and Second Positive systems of nitrogen emitted in the positive column of a glow discharge burning in a mixture of nitrogen and argon. The apparatus used is shown schematically in Fig 1: B_1 and B_2 are bulbs containing the two components of the gas mixture, B_3 is a reserve bulb connected to a discharge tube R; M is a manometer and S is a slit of a spectrograph. Taps a_1 and c_1 were used to supply small portions of gas to the apparatus. The discharge

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Dependence of the Intensity of Nitrogen Bands in a Mixture with Argon on the Electron Temperature in a Glow Discharge

tube is shown in Fig 2, where A and K are cylindrical electrodes, B is the discharge channel, C is water cooling and S is the spectrograph slit. The discharge current was kept constant at 50 mA. Spectra emitted in the positive column of the discharge were recorded photographically and the relative intensity of the nitrogen band was determined by photographic photometry. The author used the 6545 Å band of the First Positive system and 8 bands (listed in Table 1) of the Second Positive system of nitrogen. Measurements of the relative intensity of bands were carried out at total pressures of 0.2, 0.5, 1.0 and 1.5 mm Hg and at various partial pressures of nitrogen and argon. The changes in the band intensities were expressed in terms of a quantity K, given by $K = (I_{N_2}/P_{N_2}):(I_{oN_2}/P_o)$, where the first term is the ratio of the intensity of a nitrogen band to nitrogen pressure in a mixture of nitrogen with another gas, and the second term gives the same ratio for pure nitrogen. The quantity K represents

Dependence of the Intensity of Nitrogen Bands in a Mixture with Argon on the Electron Temperature in a Glow Discharge

the change in the excitation probability of nitrogen bands with the introduction of a foreign gas. Table 2 shows that the value of K increases with increase of the partial pressure of argon. This is true both for the First and the Second Positive systems of nitrogen. This increase in the excitation probability of nitrogen bands may be due to an increase in the electron temperature or due to collisions of the second kind with metastable argon atoms. An approximate calculation of the electron temperature as a function of the partial pressures of nitrogen and argon showed that the increase in the probability of excitation of nitrogen bands with the increase of the amount of argon is due mainly to the rise of electron temperature i.e. due to electron collisions. This work was carried out in the Spectroscopy Laboratory of the Siberian Physico-Technical Institute in 1953/4 under the direction of

SOV/139-58-6-9/29

Dependence of the Intensity of Nitrogen Bands in a Mixture with Argon on the Electron Temperature in a Glow Discharge

Professor N.A.Prilezhayeva. There are 3 figures, 3 tables and 8 references of which 6 are Soviet, 1 English and 1 German.

ASSOCIATION: Kishinevskiy Gosuniversitet (Kishinev State University)

SUBMITTED: 28th March 1958

Card 4/4

SOV/51-6-3-24/28

AUTHOR: Sychev, V.P.

TITLE: On the Problem of Collisions of the Second Kind in a Mixture of Gases N_2 + Ar (K voprosu ob udarakh vtorogo roda v smesi gazov N_2 + Ar)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 3, pp 419-422, (USSR)

ABSTRACT: It has been reported (Refs.1-4) that the band intensity of the Second Positive system of nitrogen is high in discharges occurring in nitrogen-argon mixtures. To find whether this might be due to collisions of the second kind between metastable argon atoms and nitrogen molecules, the author calculated the ratio of the effective cross-section for such collisions (Q) to the cross-section for collisions between electrons and nitrogen molecules (Q_1). The calculation showed that, at a total pressure of 1 mm Hg (argon pressure 0.88 mm Hg) and a temperature of 400°K, $Q/Q_1 \sim 10^{-2}$, i.e. the second-kind collisions are, under the conditions considered, of little importance compared with collisions of the first kind (electron collisions).

Card 1/2

SOV/51-6-3-24/28

On the Problem of Collisions of the Second Kind in a Mixture of Gases N_2 + A

There are 12 references, of which 4 are Soviet, 1 translation from English into Russian, 3 German, 2 English, 1 French and 1 Indian.

SUBMITTED: July 10, 1958

Card 2/2

SYCHEV, V.P., starshiy elektromekhanik; STOVBYRA, I.V., starshiy elektromekhanik

Automatic device for checking signal light lamps. Avtom.telem. i sviaz' 4 no.11:32 N '60. (MIRA 13:11)

1. Chelkarskaya distantsiya signalizatsii i svyazi Kazakhskoy dorogi.
(Railroads--Signaling) (Railroads--Electric equipment)

30421

S/058/61/000/009/045/050
A001/A101

24.6110

AUTHOR: Sychev, V.P.

TITLE: Stepped excitation of nitrogen bands in a glow discharge

PERIODICAL: Referativnyy zhurnal. Fizika, no. 9, 1961, 251, abstract 9Zh78 ("Uch. zap. Kishinevsk. un-t", 1960, v. 55, 37 - 41)

TEXT: The phenomenon of enhancement of nitrogen bands in the glow discharge in the mixture of N_2 and argon gases is investigated. To clarify the mechanism of this phenomenon, nitrogen molecular bands emitted by a gas-discharge tube, were directed into a glass spectrograph, and their intensity was measured photometrically. Within the investigated range of discharge current variation ($\sim$5 - 100mamp) the intensity of nitrogen bands rises practically linearly with the current increase, which points to the absence of stepped excitation. The investigation conducted earlier (RZhFiz, 1960, no. 2, 4574) has shown that impacts of the second kind also do not affect noticeably the variation of nitrogen band intensity. On the basis of these data the conclusion was drawn that intensity of molecular nitrogen bands is determined by electronic temperature.

I. Flaks

[Abstracter's note: Complete translation]

Card 1/1

S/058/61/000/009/044/050
A001/A101

AUTHORS: Sychev, V.P., Sycheva, T.M.

TITLE: Equation of energy balance of an electron in electric discharge

PERIODICAL: Referativnyy zhurnal. Fizika, no. 9, 1961, 248, abstract 9Zh60 ("Uch. zap. Kishinevsk. un-t", 1960, v. 55, 43 - 46)

TEXT: The authors present a quantitative estimate of elastic and inelastic energy losses of electrons in a glow discharge. In the way from the cathode to the anode the electron gains energy on account of the external electric field and loses it at elastic and inelastic collisions with gas molecules. By solving the equation of energy balance for electrons, the authors derive an expression for the limiting value of electron energy determining the electronic temperature of the plasma. The calculational results agree qualitatively with experimental data.

I. Flaks

[Abstracter's note: Complete translation]

Card 1/1

SYCHEV, V.P.; SYCHEVA, T.M.

Flow of electrode matter to the discharge gap of an a-c arc. (MIRA 15:7)
Uch. zap. Kish. un. 49:114-118 '61.
(Electric arc)

SYCHEV, V.P., starshiy inzh.

Plank for fastening interchangeable relay plates. Avtom., telem. i sviaz' 6 no.3:37 Mr '62. (MIRA 15:3)

1. Kontrol'no-ispytatel'nyy punkt Chelkarskoy distantsii signalizatsii i svyazi Kazakhskoy dorogi.
(Railroads--Electric equipment) (Electric relays)

S/032/62/028/008/003/014
B107/B180

AUTHORS: Sychev, V. P., and Mikhaylova, A. S.

TITLE: Quantitative spectral analysis of Manganin microwire

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 8, 1962, 950

TEXT: A method was developed for determining manganese in concentrations of 6-12% and nickel from 1.5-6%. The glass insulation is removed by 40% hydrofluoric acid from a microwire 2-4 mm long which is then weighed and placed into a 2 mm-deep hollow in a carbon electrode coated with polystyrene. It is dissolved by drops of nitric acid (1:1) and covered with carbon powder. Standard specimens of manganin solutions are insected into the carbon electrode with a microburette. Better results are obtained with ash-free filters. (A. N. Prokop'yeva. Opyt prakticheskogo primeneniya emissionnogo spektral'nogo analiza v elektrovakuumnoy promyshlennosti, LDNTP (1959)), which are destroyed with a 1:4 solution of sulfuric acid in alcohol. An arc is used for analysis, a ДГ-2 (DG-2) generator, and the current in the primary circuit of the transformer is 5 a. The second electrode is copper, electrode spacing is 2 mm, slit width of the ИСП-28

Card 1/2

MASLOV, Yu.N., kand.tekhn.nauk; SYCHEV, V.P., kand.tekhn.nauk

Establishing characteristics for the adjustment of carburation systems of engines with spark ignition. Izv.vys.ucheb.zav.; mashinostr. no.7: 101-106 '64. (MIRA 17:10)

1. Saratovskiy politekhnicheskiy institut.

SYCHEV, V.P.; MIKHAYLOVA, A.S.; TRAPITSYN, N.F.; MULLAYANOV, F.I.

Exchange of experience. Zav.lab. 28 no.8:950 '62. (MIRA 15:11)

1. Kishinevskiy gosudarstvennyy universitet i Moldavskiy nauchno-issledovatel'skiy institut elektrotekhnicheskoy promyshlennosti (for Sychev, Mikhaylova). 2. Kirgizskiy gosudarstvennyy universitet (for Trapitsyn, Mullayanov).

(Spectrum analysis)

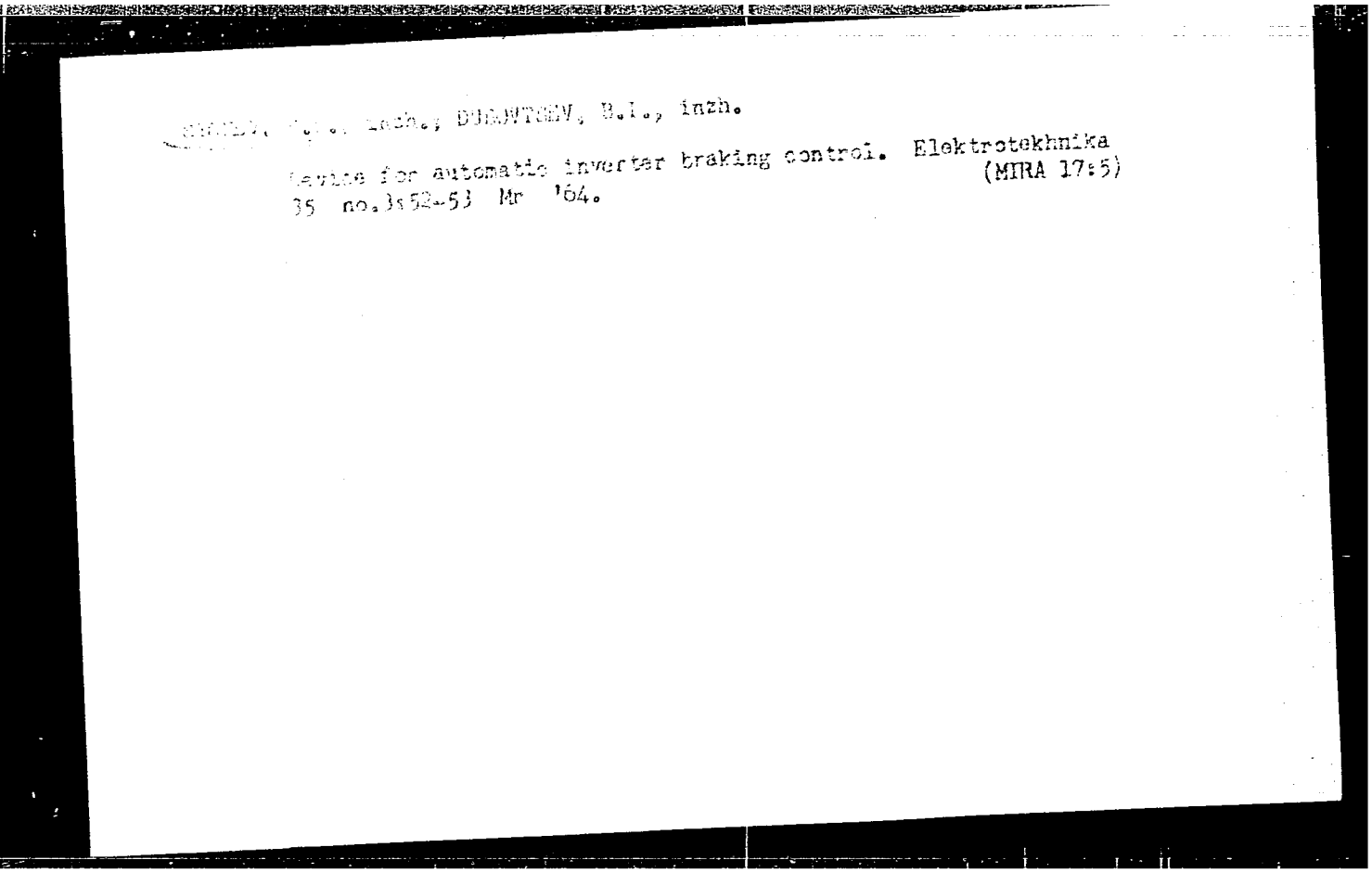
SHCHUKIN, P.A.; SYCHEV, V.S.

Possibility of using vibration to intensify the heating and briquetting of coals. Trudy IGI 20:215-217 '63. (MIRA 17:8)

SYCHEV, V.S.

Deep straight drilling. Razved. i okh.nedr 31 no.4: 54-56 Ap '65. (MIRA 19:1)

1. Kochkarskiy gornometallurgicheskiy kombinat.



[illegible], Yu. A., kand. tekhn. nauk; DUBOVTSEV, B.I., inzh.

Device for automatic inverter braking control. Elektrotekhnika 35 no.3:52-53 Mr '64. (MIRA 17:5)

SYCHEV, V.S., inzh.

Using mechanical rippers in strip mines. Gor. zhur. no.7:70-71 Jl '64. (MIRA 17:10)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut ugol'noy, rudnoy, neftyanoy i gazovoy promyshlennosti Ukrainskoy SSR, Kiyev.

[illegible], kand.tekhn.nauk SYCHEV, V.S., inzh.

[illegible]ive of a reversible cold rolling mill. Elektrichestvo [illegible]21 Ag '61. (MIRA 14:10)

1. Kar'kovskiy elektromekhanicheskiy zavod (for Tolmach).
2. Nauchno-issledovatel'skiy i proyektno-konstruktorskiy institut gornogo i obogatitel'nogo oborudovaniya (for Sychev).
(Rolling mills--Electric driving)

SYCHEV, V.V.

SOV/96-58-7-4/22

AUTHOR: Sheyndlin, A.Ye., Dr.Tech.Sci., Shpilrayn, E.E., Cand.Tech.Sci. and Sychev, V.V., Engineer.

TITLE: The specific heat at constant pressure c_p of steam at the saturation line (Teployemkost' c_p vodyanogo para na linii nasyshcheniya)

PERIODICAL: Teploenergetika, 1958, No.7, pp. 13-17 (USSR)

ABSTRACT: The enthalpy of supersaturated steam is best calculated by integrating values of c_p on isobars from the saturation curve to the temperature at which the enthalpy is to be determined. However, as it is very difficult to determine c_p near the saturation curve, values are usually obtained by extrapolation, but this procedure is unreliable near the critical pressure. The authors, therefore, decided to calculate the c_p of steam at the saturation line by a method basically independent of experimental determinations of c_p for superheated steam. An equation is then written for the specific heat of steam at the saturation line; it includes terms for the specific heat of water at the saturation line at the same temperature, the latent heat of steam and its differential with respect to temperature, the specific volumes of dry saturated steam and water on the saturation line, and their partial differential with respect to temperature at constant pressure. This equation forms the basis of all the calculations. In using it, a large number of calorific and thermal data for water and steam have to be determined, but these determinations can all be made more accurately than direct

Card 1/3

The specific heat at constant pressure c_p of steam at the saturation line.

determination of c_p near the saturation line. The calorific and thermal data used in the present calculations are given in Table.1. The method of calculating each of the terms of the equation is then explained. Graphs of differentials of latent heat of steam, specific volume of steam and of water are given in Figs.1., 2., and 3. The accuracy of the calculations was evaluated by the methods of the theory of errors. The accuracy of determination of the differentials was determined by an indirect method. The errors in each of the terms are then evaluated numerically and finally it is stated that the overall error in the determination of c_p did not usually exceed 1 - 1.5%. The error is somewhat greater near the critical region. Calculated values of c_p from 170 - 380°C are displayed in Table.2, which also gives values recommended by the All-Union Thermotechnical Institute and percentage differences between the two sets of values. The calculated values are then compared with experimental values of several authors and a number of differences are found to exist which exceed the errors of calculation or of experiment in some regions. Further theoretical and practical investigations in these regions are

The specific heat at constant pressure c_p of steam at the saturation line.

required to establish the reasons for the differences.
There are 5 figures, 2 tables, 16 literature references
(4 Soviet, 7 English and 5 German)

ASSOCIATION: Moskovskiy Energeticheskiy Institut (Moscow Power Institute)

1. Steam - Specific heat 2. Steam - Enthalpy 3. Steam - Pressure factors

05280
SOV/170-59-7-11/20

10(5)

AUTHORS: Sheyndlin, A.Ye., Shpil'rayn, E.E., Sychev, V.V.

TITLE: On the Heat Capacity C_p of Water and Water Vapor at Supercritical Pressures

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 7, pp 75 - 79 (USSR)

ABSTRACT: There are several methods for working out graphs expressing relationships between heat capacity C_p and various factors. Ya. Havlíček and L. Miskovskiy [Ref 9] proposed a method for analyzing experimental data on C_p by plotting the lines C_p = const in the coordinate system p - T. This method, as well as other existing methods, possesses some intrinsic drawbacks. The authors have worked out a new method which is based on the coordinate system: $\frac{1}{C_p}$ versus p. This graph is shown on Figure 3 which is plotted by isochores. This made it possible (after smoothing the isochores) to obtain from this graph isobars of C_p as functions of V. Then the values of T are found from the v - T graph, and the smoothed data are plotted in the C_p - T graph by isobars. The values of C_p corresponding to the round values of pressure are then obtained from these isobars and compiled into a table presented in the paper. This method was employed for analyzing the available experimental data on heat capacity C_p of water

Card 1/2

SHEYNDLIN, A.Ye., doktor tekhn. nauk; SHPIL'RAYN, E.E., kand. tekhn. nauk; SYCHEV, V.V., inzh.

Reference values of the specific heat of steam. Teploenergetika 6 no.12:80-83 D '59. (MIRA 13:3)

1.Moskovskiy energeticheskiy institut.
(Steam)

SYCHEV, V.V.

Heat capcity cv in the two-phase region of the coexistence parameters of water. Inzh.-fiz.zhur. no.7:10-16 Jl '60. (MIRA 13:7)

1. Energeticheskiy institut im. G.M.Krzhizhanovskogo, g. Moskva.
(Water vapor) (Heat capacity)

SHEYNDLIN, A.Ye., doktor tekhn.nauk, SHPIL'RAYN, E.E., kand.tekhn. nauk; SYCHEV, V.V., inzh.

Heat capacity C_p of water and steam at the saturation line. Teploenergetika 7 no.7:23-27 Jl '60. (MIRA 13:7)

1. Moskovskiy energeticheskiy institut.
(Heat capacity)
(Water--Thermal properties)

RUDAKOV, Vsevolod Nikolayevich; PEKSHEVA, Maya Vasil'yevna; SYCHEV, V.V., red.; BORUNOV, N.I., tekhn. red.

[Use of atomic energy in electric power plants] Ispol'zovanie atomnoi energii na elektrostantsiiakh. Moskva, Gos. energ.izd-vo, 1961. 158 p. (MIRA 14:12)

(Nuclear reactors)

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S/096/61/000/003/010/012
E194/E155

11.3800

AUTHOR: Sychev, V.V., Engineer

TITLE: A New Equation for the Adiabatic Index of Saturated Steam

PERIODICAL: Teploenergetika, 1961, No. 3, pp. 67-70

TEXT: The adiabatic index is defined as follows:

$$k = -\frac{v}{p}\left(\frac{\partial p}{\partial v}\right)_s \qquad (1)$$

where p is the pressure, v is the specific volume, s is the entropy. Empirical expressions for the adiabatic index have been known for a long time. The best theoretical expressions hitherto available were derived by I.I. Novikov (Ref.4) and N.I. Belokon' (Ref.5). Although Belokon's expression is more general than that of Novikov, both are cumbersome and inconvenient and contain a number of complexes whose physical meanings are not evident. A simpler formula may be derived from the circumstance that the partial differential coefficient

$$\left(\frac{\partial v}{\partial p}\right)_s$$

A New Equation for the Adiabatic Index of Saturated Steam

is additive in the two-phase region. The following expression is then derived:

$$k(T,x) = -\frac{v'(1-x) + v''x}{p\left[\left(\frac{\partial v}{\partial p}\right)'^{\text{ПФ}}_{s}(1-x) + \left(\frac{\partial v}{\partial p}\right)''^{\text{ПФ}}_{s}x\right]} \qquad (16)$$

The notation is the same as was used in earlier formulae. Calculation of the partial differential coefficient terms is then explained. By means of this formula the following nomogram was constructed to determine the adiabatic index of saturated steam. The values of $(\partial v/\partial p)_s$ and of the adiabatic index of steam on the saturation line were calculated, It is also shown analytically that there is a stepwise change in the adiabatic index on passing through the boundary curve.
There are 1 figure, 1 table and 9 references: 5 Soviet and 4 non-Soviet.

ASSOCIATION: Moskovskiy energeticheskiy institut
(Moscow Power Engineering Institute)

S/170/61/004/006/005/015
B129/B212

AUTHOR: Sychev, V. V.

TITLE: Speed of sound in water and water vapor along the saturation line

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, v. 4, no. 6, 1961, 64-69

TEXT: The results are brought of a calculation of the speed of sound in water along the saturation line and in dry saturated water vapor located in the single-phase and two-phase region in a temperature range from 0^{0} to 340°C. A comparison is made with existing experimental data. It is known that the adiabatic compressibility will change discontinuously during the transition through the boundary line; this will bring about a change of the speed of scund. The speed of sound can be calculated with the Laplace equation, but only along the boundary line of the single-phase medium; a different approach has to be used for the two-phase medium. If the speed of sound is given by $a' = \lim_{T \to T} a$ for the boundary of the two-phase region,

Card 1/3

Speed of sound in water and ...

the author finds for the speed of sound $a' = v_\sigma\left(\frac{dp}{dT}\right)\sqrt{gT/c'_v}$. This expression is valid for all saturation lines and is much simpler and more useful than the approximation formula of L. D. Landau and Ye. M. Lifshits (Mekhanika sploshnykh sred (Mechanics of compound media)); it is equivalent to that of V. I. Avdonin and I. I. Novikov (PMTF, no. 1, 58, 1960). Together with the expression for the single-phase region $a = \sqrt{-gv_\sigma^2(\partial p/\partial v)_s}$ it is possible to calculate the speed of sound in water along the saturation line and also in dry saturated water vapor. From the experimental results shown in Fig. 1 and the theoretical ones obtained, it is apparent that both agree satisfactorily. The author concludes that during propagation of sound in the rarefaction zone of saturated dry vapor no condensation will occur. V. F. Nozdrev is mentioned. There are 1 figure, 1 table, and 12 references: 8 Soviet-bloc and 4 non-Soviet-bloc.

ASSOCIATION: Laboratoriya vysokikh temperatur AN SSSR (Laboratory of High Temperatures of the AS USSR)

SYCHEV, V.V.

Theory of the critical region. Inzh.-fiz. zhur. 4 no.9: 127-131 S '61. (MIRA 14:8)

1. Laboratoriya vysokikh temperatur AN SSSR, g. Moskva.
(Thermodynamics)

SYCHEV, V.V.

Relation between the velocity of sound in a liquid and in its saturated vapor. Akust. zhur. 7 no.3:345-348 '61. (MIRA 14:9)

1. Moskovskiy energeticheskiy institut.
(Sound--Speed)

SYCHEV, V.V.

Generalization of the Planck-Gibbs equation applied to caloric surfaces of state. Zhur. fiz. khim. 35 no.7:1638-1639 Jl '61. (MIRA 14:7)

(Materials--Thermal properties)
(Critical point)

SYCHEV, V.V., inzh.

Joule-Thomson coefficient for water and steam at the saturation level. Teploenergetika 9 no.1:66-69 Ja '62. (MIA 14:12)

1. Moskovskiy energeticheskiy institut.
(Water)
(Steam)

KIRILLIN, Vladimir Alekseyevich; SHEYNDLIN, Aleksandr Yefimovich; SYCHEV, V.V., red.; BUL'DYAYEV, N.A., tekhn. red.

[Studies of the thermodynamic properties of substances] Issledovaniia termodinamicheskikh svoistv veshchestv. Moskva, Gosenergoizdat, 1963. 559 p. (MIRA 16:5)
(Matter--Thermodynamic properties)

KAZAVCHINSKIY, Ya.Z., prof.; KESSEL'MAN, P.M., kand. tekhn. nauk; KIRILLIN, V.A., akademik; RIVKIN, S.L., kand. tekhn. nauk; SYCHEV, V.V., kand. tekhn. nauk; TIMROT, D.L., prof.; SHEYNDLIN, A.Ye., prof.; SHPIL'RAYN, E.E., dots.; BUL'DYAYEV, N.A., tekhn. red.

[Heavy water; its thermophysical properties] Tiazhelaia voda; Teplofizicheskie svoistva. Moskva, Gosenergoizdat, 1963. 255 p. (MIRA 17:2)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur pri Moskovskom energeticheskom institute (for Kirillin, Sychev, Timrot, Sheyndlin, Shpil'rayn). 2. Vsesoyuznyy nauchno-issledovatel'skiy teplotekhnicheskiy institut imeni F.E. Dzerzhinskogo (for Rivkin). 3. Odesskiy institut inzhenerov morskogo flota (for Kazavchinskiy). 4. Odesskiy tekhnologicheskiy institut (for Kessel'man).

ACCESSION NR: AP4000400 S/0294/63/001/001/0050/0055

AUTHORS: Sy*chev, V. V.; Andrianov, V. V.

TITLE: Effect of gravitational factors on specific heat measurements c_v near the critical point

SOURCE: Teplofizika vy*sokikh temperatur, v. 1, no. 1, 1963, 50-55

TOPIC TAGS: gravitation, specific heat, heat capacity, critical point, physical property, thermodynamic property

ABSTRACT: In view of the lack of either experimental or theoretical published data on this subject, the author considers a hypothetical calorimetric vessel placed in a thermostat in which critical temperature is maintained. Although the pressure variation along the height of the vessel is very slight, near the critical point this variation causes a noticeable variation in density of matter, so that the critical state of matter is attained at some section of the vessel

Card 1/2

ACCESSION NR: AP4000400

in such a way that the position of the cross section in which the critical state is realized varies from the upper point of the vessel to a point on its bottom in accordance with the different values of the specific volume of the matter averaged over the vessel. The effects due to gravity are calculated on the basis of this model, and it is suggested that a precision experimental study of these phenomena would be of great interest. Original article has: 7 formulas and 5 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut vysokikh temperatur (High Temperature Research Institute)

SUBMITTED: 27Apr63 DATE ACQ: 13Dec63 ENCL: 00

SUB CODE: AS NO REF SOV: 003 OTHER: 001

Card 2/2

SYCHEV, V.V. (Moskva); AVANESOVA, N.S. (Moskva)

Uniformly accelerated motion of a plane plate in a viscuous compressible gas. Zhur. vych. mat i mat fiz. 3 no.6:1067-1076 N-D '63. (MIRA 17:1)

L 17138-63 EWT(1)/BDS AFFTC/ASD/ESD-3/APGC Pi-4 RB

ACCESSION NR: AP3000451 S/0170/63/006/005/0128/0132

62
61

AUTHOR: Sy*chev, V. V.

TITLE: Further contribution to the question of the propagation of sound waves in the saturated vapors of liquids

21

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 6, no. 5, 1963, 128-132

TOPIC TAGS: sound speed, saturated vapor, sound propagation, acoustics

ABSTRACT: In 1960 V. I. Avdonin and I. I. Novikov published an article (PMTF, no. 1, 1960) giving the results of an experimental investigation of the speed of sound in saturated water vapor. In a second article (Inzhenerno-fizicheskiy zhurnal, no. 6, 1961) the author has himself computed the speed of sound in saturated water vapor on the basis of existing accurate data on the thermodynamic properties of water and water vapor at the saturation line. His results indicate that when a sound wave is propagated in a dry saturated vapor there is no condensation of the vapor in the zone of rarefaction of the wave. This conclusion has been denied by Avdonin and Novikov (Inzhenerno-fizicheskiy zhurnal, no. 12, 1961). The author advances further arguments to support his point of view. Orig. art. has: 9 formulas and 3 figures.

Card 1/2

L 17138-63

ACCESSION NR: AP3000451

ASSOCIATION: Nauchno-issledovatel'skiy institut vy*sokikh temperatur, Moscow (High-Temperature Scientific Research Institute)

SUBMITTED: 00	DATE ACQ: 10Jun63	ENCL: 00
SUB CODE: PH	NO REF SOV: 006	OTHER: 001

Card 2/2

SYCHEV, V.V.

Some thermodynamic characteristics of the triple point. Inzh.-fiz. zhur. 6 no.7:124-125 Jl '63. (MIRA 16:9)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur pri Moskovskom energeticheskom institute, Moskva.
(Triple point—Thermodynamic properties)

SYCHEV, V.V.

Anomaly of the p - T-diagram for water in the low temperature range. Inzh.-fiz. zhur. 6 no.8:116-117 Ag '63. (MIRA 16:10)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur, Moskva.

SYCHEV, V. V., kand. tekhn. nauk

Important phase in the study of the properties of water vapor.
Teploenergetika 10 no.3:93-94 Mr '63. (MIRA 16:4)

(Water vapor)

SYCHEV, V.V., kand. tekhn. nauk

Analysis of existing data on calorific capacity c_v of water and steam in a saturation line. Teploenergetika 10 no.7: 68-73 Jl '63. (MIRA 16:7)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur pri Moskovskom energeticheskom institute.
(Boilers)

SHEYNDLIN, A.Ye., doktor tekhn. nauk; SYCHEV, V.V., kand. tekhn. nauk; MUNIR MUKHAMMED KHILAL', kand. tekhn. nauk; GORBUNOVA, N.I., inzh.

Experimental study of the enthalpy of water and steam at temperatures up to 390° C and pressures up to 500 kg./cm^2. Teploenergetika 10 no.9:76-80 S '63. (MIRA 16:10)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur pri Moskovskom energeticheskom institute.
(Water--Thermal properties)

ACCESSION NR: AP4044525 S/0294/64/002/004/0573/0582

AUTHOR: Sy*chev, V. V.

TITLE: Some problems in critical point thermodynamics 1. On the magnitude of $(\partial^2 p/\partial T \partial v)_{cr}$ and the possibility of expanding thermodynamic functions in a Taylor series near the critical point

SOURCE: Teplofizika vy*sokikh temperatur, v. 2, no. 4, 1964, 573-582

TOPIC TAGS: thermodynamic property, critical volume, partial differential, Taylor series, isothermal process

ABSTRACT: Thermodynamic properties near the critical point were investigated, and for a pure substance it was shown that $(\partial^2 p/\partial T \partial v)$ is identically zero at the critical point. Various experimental measurements of $\partial p/\partial V$ versus T close to the critical point in xenon and carbon dioxide were reviewed and the results found to be inconclusive as to whether the slopes of these curves became zero at $T_{critical}$. Starting with the following expression of $\partial^2 p/\partial T \partial V$,

$$\frac{\partial^2 p}{\partial T \partial v} = -\left[\frac{\partial}{\partial v}\left(\frac{\partial T}{\partial p}\right)_v\right]_T \Big/ \left(\frac{\partial T}{\partial p}\right)_v^3$$

Card 1/3

ACCESSION NR: AP4044525

It is shown that the numerator vanishes identically because at the critical point the following is true

$$\left(\frac{\partial p}{\partial v}\right)_T^{\text{кр}} = 0 \quad \text{и} \quad \left(\frac{\partial^2 T}{\partial p^2}\right)_v^{\text{кр}} = 0 .$$

A set of manipulations with partial differentials eventually leads to the identity

$$\left(\frac{\partial^2 v}{\partial T \partial p}\right)^{\text{кр}} = 0,$$

which is shown to be true for pure substances. A physical interpretation is then given for the above identity by calculating the second derivative either by using

$$[(\partial / \partial v)(\partial p / \partial T)_v]_{T_{\text{кр}}}$$

or

$$[(\partial / \partial T)(\partial p / \partial v)_T]_{v_{\text{кр}}}^{V}$$

One shows an isotherm with an horizontal tangent at $V = V_{cr}$ and the other an isochor with a horizontal tangent. A general conclusion is then reached on the limitations imposed by the Taylor expansion technique for various thermodynamic properties near the critical point. "The author expresses his gratitude to S. P. Maly*shenko for his valuable discussions of this work." Orig. art. has: 36 equations and 6 figures.

Card 2/3

ACCESSION NR: AP4044525

ASSOCIATION: Nauchno-issledovatel'skiy institut vy*sokikh temperatur (Scientific Research Institute of High Temperatures)

SUBMITTED: 20Apr64 ENCL: 00

SUB CODE: TD NO REF SOV: 006 OTHER: 005

Card 3/3

AP5004152 UR/0294/64/002/006/0884/0891

AUTHOR: Sychev, V. V.

TITLE: Some problems in thermodynamics of the critical point. 2. On discontinuity in thermodynamic magnitudes at the critical point

SOURCE: Teplofizika vysokikh temperatur, v. 2, no. 6, 1964, 884-891

TOPIC TAGS: thermodynamic critical point, thermal capacity, sound speed, thermodynamics

ABSTRACT: The behavior of the heat capacity c_v and of speed of sound "a" through the critical point was studied analytically. The literature is surveyed critically, then, starting with an expression for change in c_v, $\frac{\Delta c_v}{\Delta T} = \frac{dp/dT - (\partial p/\partial T)_v}{dT/dv}$ and using partial differentials, it is shown in two independent ways that $c_v^{Cr} = 0$ at the critical point. Furthermore, an expression is obtained for $(\partial c_v/\partial T)_v$, $\left(\frac{d^2u}{dv^2}\right)^{sp} = \left(\frac{\partial c_v}{\partial T}\right)_v \left(\frac{dT}{dv}\right)^2 + c_v \frac{d^2T}{dv^2}$, and it is shown that the partial of c_v with T is finite at the critical point. These results are then compared with existing

Card 1/2

L 20997-65
ACCESSION NR: AP5001152

Analyses by I. P. Krichevskiy and N. Ye. Khazanova (Zh. fiz. khimii, 29, 1087, 1955); [illegible] (Ukr. fiz. zh., No. 223 [illegible], 1961), and it is concluded that c_v does not [illegible] a discontinuity at the critical point. Starting from an expression for [illegible] at the critical point [illegible] $\left(a_{кр}^{1\Phi} - a_{кр}^{2\Phi}\right) = \frac{\quad}{g v_{кр}^2 T_{кр} (dp/dT)_{кр}^2}$, the contention of V. F. Nozdrev (Primeneniye ul'traakustiki v molekulyarnoy fizike, Moscow, 1958) that "a" does not undergo a jump at the critical point is verified. Orig. art. has: 48 formulas and 1 figure.

ASSOCIATION: Nauchno-issledovatel'skiy institut vy*sokikh temperatur (Institute for Scientific Research in High Temperatures)

SUBMITTED: 18May64 ENCL: 00

SUB CODE: TD NR REF SOV: 014 OTHER: 002

Card 2/2

SYCHEV, V.V., kand. tekhn. nauk

Sixth International Conference on the Properties of Water Vapor. Vest. AN SSSR 34 no.5:129 My '64. (MIRA 17:6)

L 13639-65 EWT(1)/EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(j)/EWP(b) Pc-4/Pr-4/
Ps-4/Pi-4/Pu-4/Pa-4 RPL/ASD(p)-3/AFDC(a)/RSD/ASD(m)-2/AFWL/AFETR/ASD(f)-2/
ACCESSION NR: AP4047195 S/0030/64/000/010/0099/0099

AUTHOR: Sychev, V. V. (Candidate of technical sciences)

TITLE: The Second Session of the Committee on Thermodynamic Properties Tables for Technically Important Gases

SOURCE: AN SSSR. Vestnik, no. 10, 1964, 99

TOPIC TAGS: thermodynamics, thermodynamic property, gas dynamics, gasdynamic parameter, gaseous substance, air air components, inert gas, methane, ethane, ethylene, fluorine, chlorine

ABSTRACT: The Second Session of the Committee (of the International Union for Theoretical and Applied Chemistry) on Thermodynamic Properties Tables for Technically important gases convened on July 2 in London. It is the purpose of this Committee (established in 1962) to develop basic tables of thermodynamic properties of air, its components, carbon dioxide, hydrogen, inert gases, methane, ethane, ethylene, fluorine, chlorine, and others. The tabulated values are to be established by analyzing and averaging the experimental and calculated data obtained by various investigators. The absence of such tables complicates calculations related to various chemical processes and apparatus. The entire project will span

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L 136 9-65
ACCESSION NR: AP4049195

about ten years. Three groups were established at the session to work with: 1) air and its components; 2) carbon dioxide; 3) proper methods for constructing tables of thermodynamic properties. The last group will derive the state-of-matter equations from the basic data. These equations will be in a form suitable for use with digital computers. The three groups in charge of hydrogen and inert gases, of halogens and their hydrides, and [illegible] will start their work in 1965.

ASSOCIATION: Mezhdunarodnyy soyuz po teoreticheskoy i prikladnoy khimii (The International Union for Theoretical and Applied Chemistry)

SUBMITTED: 00 ENCL: 00

SUB CODE: GC, TD NO REF SOV: 000 OTHER: 000

Card 2/2

L 38-65 EEC(b)-2/EPF(c)/EPF(n)-2/EPR/EWP(j)/EWT(1)/EWT(m)/EWP(b)/EEC(f)
Pu-4/Pu-4 RAEM(c)/IJP(c) GG/RM/WW/JD/JG
ACCESSION NR: AP4049130 S/0020/64/159/001/0060/0062

AUTHOR: Sy*chev, V. V.; Zenkevich, V. B.; Andrianov, V. V.; Al'tov, V. A.

TITLE: Discontinuity of the critical a-c current value in passing through the lambda-point of a superconducting solenoid

SOURCE: AN SSSR. Doklady*, v. 159, no. 1, 1964, 60-62

TOPIC TAGS: superconductivity, lambda point, superdonductive solenoid, AC superconductivity, critical current discontinuity, helium immersed solenoid

ABSTRACT: The factors determining the critical current value in superconducting solenoids were studied experimentally by establishing the behavior of the critical current value as the temperature was reduced. Network power at a frequency of 50 cps was used in measurements. The coils were made of 65 BT (a multi-component Nb-Ti-based alloy developed by the Central Scientific Research Institute of Ferrous Metallurgy) superconducting wire 0.25 mm in diameter, "viniflex" coated to a diameter of 0.30 mm. The experimental arrangement permitted lowering the temperatures in the cryostat to 2K by reducing the helium vapor pressure in the chamber. Three types of solenoids

Card 1/3

were investigated. Type I had 6200 turns with inside and outside diameters of 16 and 45 mm respectively, and a coil height of 35 mm. The value of the critical current density remained constant in this solenoid, down to a temperature of about 2.17K where a sharp upward jump occurred. The solenoids of types II and III were wound on a polyfluoroethylene form of 55 mm high and having an axial hole of 6 mm in diameter. Solenoid II had 5000 turns, its inside and outside diameters were 16 and 39 mm, and it was 35 mm high. Solenoid III had 2700 turns, inside and outside diameters of 16 and 29 mm, and a height of 35 mm. The measurements revealed that the value of critical current density rises sharply with smaller solenoids. The results obtained point to a strong dependence of the critical current value on the penetration of the liquid helium into the inner zone of the winding. Helium vapors in that zone apparently do not prevent the inflow of the liquid. In any case, the results obtained cannot be satisfactorily explained solely by changes in heat conduction from the surface of the solenoid during the transition through the lambda point. [Orig. art. has: 3 figures.]

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001654220014-6"

L 1[illegible]-65

ACCESSION NR: AP4049130

ASSOCIATION: Nauchno-issledovatel'skiy institut vysokikh temperatur Moskovskogo energeticheskogo instituta (Scientific Research Institute of High Temperatures, Moscow Power Engineering Institute)

SUBMITTED: 15Jun63	ENCL: 00	SUB CODE: EC
NO REF SOV: 000	OTHER: 004	ATD PRESS: 3136

Card 3/3

SYCHEV, V.V. (Moskva); ZENKEVICH, V.B. (Moskva); ANDRIANOV, V.V. (Moskva)

Investigation of the transition processes of a superconducting solenoid with inductive protection going normal. Izv. AN SSSR. Energ. i transp. no.1:100-106 Ja-F '65. (MIRA 18:4)

L 55922-65

ACCESSION NR: AP5012436 UR/0231/65/000/002/0117/0122

AUTHOR: Sychev, V. V. (Moscow); Zenkevich, V. B. (Moscow); Andrianov, V. V. (Moscow)

TITLE: The influence of the protective loop resistance on the transition of a superconducting solenoid to the normal state

SOURCE: AN SSSR. Izvestiya. Energetika i transport, no. 2, 1965, 117-122

TOPIC TAGS: semiconductor solenoid transition, impedance protected coil, superconducting coil, coil voltage surge, superconductor resistance

ABSTRACT: In an earlier paper (Izv. AN SSSR. Energetika i transport, 1965, no. 1, p. 153) the authors presented the results of an experimental study of the transition of a superconducting solenoid to its normal state for a constant value of the resistance within the protective loop. The theoretical study of such a process was carried out earlier by M. W. Dowley (Cryogenics, 1964, v. 4, no. 3, p. 153) and F. F. Smith (Rev. Sci. Instr., 1963, v. 34, p. 368). The present paper reports results using the same inductively protected solenoid but for various values of the resistance of the secondary loop. This auxiliary copper coil, whose circuit is closed through the external resistor, reduces the heat liberation and surge of voltage within the superconducting material during the transient process. Re-

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L 55922-65
ACCESSION NR: AP5012436

sults in the form of graphs cover 1) the time dependence of the current within the primary loop of the superconducting solenoid, 2) the time dependence of the voltage surge along the normal section of the solenoid accompanying the transition from the superconducting state for various values of the secondary loop resistance, 3) the changes in current within the secondary solenoid loop, 4) the dependence of the primary resistance or the additional resistance in the secondary at the instant of time the current within the superconducting windings drops to one half of its initial value, 5) the maximum voltage surge as a function of [illegible] secondary, 6) the portion of the magnetic field energy [illegible] liberation power within various elements of the system as a function of the added resistance. [illegible] with various elements of the system as a function of heat libera- [illegible] 10 formulas and 8 figures.

ASSOCIATION: None

SUBMITTED: 20Oct64 ENCL: 00 SUB CODE: EE

NO REF SOV: 001 OTHER: 002

Card 2/2

L 62181-65 EWT(1)/EWG(m) JW

ACCESSION NR: AP5010465 UR/0294/65/003/002/0253/0259
536.441:53.02

17
16
B

AUTHOR: Sychev, V. V.

21

TITLE: Some problems in the thermodynamics of the critical point. III. Curvature of the saturation line at the critical point

SOURCE: Teplofizika vysokikh temperatur, v. 3, no. 2, 1965, 253-259

TOPIC TAGS: critical point, saturation curve, specific heat

ABSTRACT: This is a companion to two other papers by the author (Teplofizika vysokikh temperatur v. 2, No. 4, 1964 and No. 6, 1964) dealing with problems involving [illegible] of the critical point. The present paper deals specifically with the curvature of the saturation curve at the critical point. It is shown that although the value of [illegible] cannot be determined by rigorous analysis, it is possible to deduce the value from experimental data on the specific heat at constant volume near the critical region.

Card 1/2

L 62181-65
ACCESSION NR: AP5010465

Making use primarily of the results of Kh. I. Amirkhanov and A. M. Kerimov (Teploenergetika, No. 3, 1963) it is shown that the curvature [illegible] It is claimed that the authors results confirm the main premises of the classical [illegible]

ASSOCIATION: [illegible]

Card 2/2

SYCHEV, V.V. (Moskva); ZENKEVICH, V.B. (Moskva); ANDRIANOV, V.V. (Moskva)

Effect of the resistance of a protective circuit on the transition process of a superconducting solenoid to normal state. Izv. AN SSSR. Energ. i transp. no.2:117-122 Mr-Ap '65.
(MIRA 18:6)

SYCHEV, V.V.

Some aspects of the thermodynamics of the critical point. Part 3: Curvature of the saturation line at the critical point. Teplofiz. vys. temp. 3 no.2:253-259 Mr-Ap '65. (MIRA 18:7)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur, Moskva.

VUKALOVICH, M.P., doktor tekhn. nauk, prof.; SYCHEV, V.V., kand. tekhn. nauk

International program for studying thermal and physical properties of water and water vapor. Teploenergetika 12 no.4:94-95 Ap '65.
(MIRA 18:5)

EWT(d)/EWT(m)/EWP(v)/EWP(t)/EWP(k)/EWP(h)/EWP(b)/EWP(l) IJP(c) JD/JG

[illegible] 001/0632/0637

[illegible] V. V. Gorbunova, N. I.

[illegible] measurements with a standard platinum

[illegible] 1965, 632-637

[illegible] measurement

Card 1/2

L 65142-65

ACCESSION NR: AP5020567

ASSOCIATION: Nauchno-issledovatel'skiy institut vysokikh temperatur (High Temperature Research Institute)

SUBMITTED: 31Oct64 ENCL: 00 SUB CODE: TD

NR REF SOV: 001 OTHER: 001

SYCHEV, V.V., kand. tekhn. nauk; SIROTA, A.M., kand. tekhn. nauk; GORBUNOVA, N.I., kand. tekhn. nauk

Compilation of international reference tables on the thermodynamic properties of gases of technical importance. Vest. AN SSSR 35 no.9:90 '65. (MIRA 18:9)

SYCHEV, V.V.; [illegible]

Inductance of a superconducting solenoid. Dokl. AN SSSR 165 no.1:73-76 N '65. (MIRA 18:10)

1. Nauchno-issledovatel'skiy institut vysokikh temperatur, Moskva.

L 05837-67 EWT(m)/EWP(j)/EWP(t)/ETI/EWP(k) IJP(c) JD/JG/RM

ACC NR: AP6027953 SOURCE CODE: UR/0020/66/169/003/0569/0572

AUTHOR: Sychev, V. V.; Zenkevich, V. B.; Andrianov, V. V.

ORG: Scientific Research Institute of High Temperatures (Nauchno-issledovatel'skiy institut vysokikh temperatur)

34
28
B

TITLE: Intrinsic magnetic flux in a superconducting solenoid

SOURCE: AN SSSR. Doklady, v. 169, no. 3, 1966, 569-572

TOPIC TAGS: solenoid, superconductivity

ABSTRACT: A new method is proposed for studying the magnetic properties of a superconducting solenoid in view of the incomplete and contradictory picture of the behavior of a solenoid in a self-field. The magnetic history of the solenoid may be described by using the concept of the total magnetic flux (magnetic linkage) of the solenoid Ψ. This quantity is the sum of the intrinsic Ψ_i and extrinsic Ψ_e fluxes of the solenoid. In an infinite solenoid the extrinsic flux is independent of the intensity of magnetization in the coil and is linearly dependent on the current I flowing in the coil, $\Psi_e = L_e I$, where L_e is a proportionality factor which may be called the extrinsic inductance of the solenoid. It is found that the factor L_e for a solenoid of finite length

 UDC: 537.312.62

SECHEV, V. V.

"Calculation of the distribution of pressures along solids of revolution under an incidence angle in a supersonic gas flow."

The proposed method of calculation is applicable for a solid of revolution with a generatrix of any shape. The method is based on the idea of investigating the flows in individual meridional planes (approximate integration of the equations of the characteristics in these planes) and certain results of the linearised theory.
(First published in 1952)

Symposium of Theoretical Work on Aerodynamics, Oborongiz, 1957, 3,000 copies, Central Aero-Hydrodynamics Inst. imeni Prof. N. Ye. Zhudovskiy.

SOV/124-59-10-11478

Translation from: Referativnyy zhurnal, Mekhanika, 1959, No. 10, p. 60 (USSR)

AUTHOR: Sychev, V. V. (Vladimir (?))

TITLE: The Calculation of Pressure Distribution Along Bodies of Revolution Under an Angle of Incidence in a Supersonic Gas Stream \

PERIODICAL: Sb. teor. rabot po aerodinamike. Moscow, Oborongiz, 1957, pp. 127-139

TEXT: The author considers the problem in linearized formulation. It consists in the assumption that the stream near the body of revolution under the angle of incidence differs only little from the stream near the same body for axisymmetric flow. The thickness of the body is not specified. In the meridional planes $\lambda = 0$ and $\lambda = \pi$, the gas motion equations are similar to the axisymmetric flow equations. The difference consists only in that an additional term with the derivative $\partial w/\partial\lambda$ appears in the continuity equation on account of the angle of incidence; there is w the peripheral velocity, which can be determined from an additional relationship found. Therefore, the characteristic method can be applied also to the present case. The equations of the characteristics of the first and second families were derived for the differential

Card 1/2

SYCHEV, V. V. (Moscow)

"Three-dimensional Hypersonic Flows Past Slender Bodies at Large Angles of Inclination."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb. 1960.

SYCHEV, V. V.

"Theory of Hypersonic Gas Flow with ___(?)___ Shaped Bodies."

report presented at the International Congress of the International Council of the Aeronautical Sciences, Zurich, Switzerland, 12-16 Sep 60

S/040/60/024/02/001/032

AUTHOR: Sychev, V. V. (Moscow)

TITLE: Three-dimensional Hypersonic Gas Flows Near Thin Bodies for Large Angles of Incidence

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol. 24, No. 2 pp. 205-212

TEXT: The small disturbance theory holds only for small angles of incidence in the approximative calculation of hypersonic flows. For increasing angles of incidence the disturbances, even caused by a thin body in the flow, become large and the small disturbance theory loses its validity. The author shows that under the assumption that all transverse extensions of the body are essentially smaller than its length, certain general statements on the process of the three-dimensional hypersonic flows can be also obtained for large angles of incidence. The results generalize the law of the plane intersections (Ref.1,2,3) and the law of similitude (Ref.4) of the small disturbance theory. For the calculation of the aerodynamic characteristics of thin bodies for large angles of incidence the author proposes approximation formulas containing only some unknown constants which depend on the form

Card 1/2

S/040/60/024/02/001/032

Three-dimensional Hypersonic Gas Flows Near Thin Bodies for Large Angles of Incidence

of the cross section of the body and which can be determined either numerically or experimentally.
There are 2 figures, and 7 references: 4 Soviet and 3 American.

SUBMITTED: November 14, 1959

Card 2/2

87789

10.8000
26.1410

S/040/60/024/005/012/028
C111/C222

AUTHOR: Sychev, V.V. (Moscow)

TITLE: On the Motion of a Tenacious Fluid Which Conducts Electricity Under the Influence of a Rotating Disc in Presence of a Magnetic Field

PERIODICAL: Prikl. mat. i mekh. 24 No.5, 906-908 S-O 1960

TEXT: The author considers the motion of a fluid with a finite conductivity in which there rotates an infinite plane disc with the conductivity zero, if besides there is a homogeneous magnetic field being perpendicular to the plane of the disc in infinity.
The equations of magnetic hydrodynamics of a tenacious incompressible fluid with the conductivity σ read in the stationary case (Ref.2):

$$\operatorname{div} \mathbf{H} = 0, \quad \operatorname{div} \mathbf{V} = 0, \quad (\mathbf{V}\nabla)\mathbf{H} = \mathbf{H}(\nabla\mathbf{V}) + \frac{1}{4\pi\sigma}\Delta\mathbf{H}$$

$$(1.1)\quad (\mathbf{V}\nabla)\mathbf{V} = -\frac{1}{\rho}\nabla\left(p + \frac{H^2}{8\pi}\right) + \frac{1}{4\pi\rho}(\mathbf{H}\nabla)\mathbf{H} + \nu\Delta\mathbf{V},$$

where $\mathbf{V}$ is the velocity, p is the pressure, ρ is the density, ν is the kinematic tenacity, and $\mathbf{H}$ is the intensity of the field.
The author introduces cylindrical coordinates r, φ, z, where $z = 0$ is the plane of the disc. The boundary conditions read (Ω is the angular

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velocity of the disc):

$$V_r = 0, \quad V_\varphi = \Omega r, \quad V_z = 0 \quad \text{for } z = 0$$

(1.2) $$V_r = 0, \quad V_\varphi = 0, \quad H_r = 0, \quad H_\varphi = 0, \quad H_z = H_0 \quad \text{for } z = \pm\infty$$

and

(1.3) $$H_r = 0, \quad H_\varphi = 0 \quad \text{for } z = 0.$$

The solution is sought in the form

$$V_r = \Omega r u(\zeta), \quad V_\varphi = \Omega r v(\zeta), \quad V_z = \sqrt{\Omega\nu}\, w(\zeta)$$

(1.4) $$H_r = \sqrt{4\pi\varrho}\,\Omega\, rf(\zeta), \quad H_\varphi = \sqrt{4\pi\varrho}\,\Omega r g(\zeta), \quad H_z = \sqrt{4\pi\varrho\Omega\nu}\, h(\zeta)$$

$$p + \frac{H_r^2 + H_\varphi^2 + H_z^2}{8\pi} = -\varrho\Omega\nu P(\zeta) \qquad \left(\zeta = \sqrt{\frac{\Omega}{\nu}}\, z\right).$$

By projection of (1.1) onto the axes of the cylindrical system and substitution of (1.4) the author obtains a system of ordinary

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differential equations, where the number of the new boundary conditions is greater than the order of the system so that the infinitely far point is singular.
For $\zeta \to \infty$ the author obtains asymptotically

$$f = A_1 e^{-\alpha_1 \lambda \zeta} + A_2 e^{-\alpha_2 \lambda \zeta} + \ldots, \qquad g = B_1 e^{-\alpha_1 \lambda \zeta} + B_2 e^{-\alpha_2 \lambda \zeta} + \ldots \tag{2.3}$$

$$h = \chi + \frac{2A_1}{\alpha_1 \lambda} e^{-\alpha_1 \lambda \zeta} + \frac{2A_2}{\alpha_2 \lambda} e^{-\alpha_2 \lambda \zeta} + \ldots$$

$$u = A_1 \frac{\lambda}{\chi} (k\alpha_1 - 1) e^{-\alpha_1 \lambda \zeta} + A_2 \frac{\lambda}{\chi} (k\alpha_2 - 1) e^{-\alpha_2 \lambda \zeta} + \ldots$$

$$v = B_1 \frac{\lambda}{\chi} (k\alpha_1 - 1) e^{-\alpha_1 \lambda \zeta} + B_2 \frac{\lambda}{\chi} (k\alpha_2 - 1) e^{-\alpha_2 \lambda \zeta} + \ldots$$

$$w = -\lambda + \frac{2A_1}{\alpha_1 \chi} (k\alpha_1 - 1) e^{-\alpha_1 \lambda \zeta} + \frac{2A_2}{\alpha_2 \chi} (k\alpha_2 - 1) e^{-\alpha_2 \lambda \zeta} + \ldots$$

where $\lambda = -w(\infty)$, $k = \frac{1}{4\pi\sigma\nu}$, $\chi = \frac{H_0}{\sqrt{4\pi\varrho\Omega\nu}}$ and $\alpha_{1,2} = \frac{1+k}{2k} \pm \sqrt{\left(\frac{1-k}{2k}\right)^2 + \frac{1}{k}\frac{\chi^2}{\lambda^2}}$;

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the constants A_1, A_2, B_1, B_2 can be determined from boundary conditions. On the other hand, for $\zeta \to 0$ it holds

(2.5) $u = u'(0)\zeta + \ldots, \quad v = v'(0)\zeta + \ldots, \quad w = -u'(0)\zeta^2 + \ldots$

$f = -\frac{1}{2k} h(0)u'(0)\zeta^2 + \ldots, \quad g = g'(0)\zeta + \ldots, \quad h = h(0) + \frac{1}{3k} h(0)u'(0)\zeta^3 \ldots$

For the components of the vectors

(4.1) $\mathbf{j} = \frac{1}{4\pi} \operatorname{rot} \mathbf{H}, \quad \mathbf{E} = \frac{1}{\epsilon} \mathbf{j} + [\mathbf{H}, \mathbf{V}]$

the author finds

$$j_r = -\sqrt{\frac{\rho}{4\pi\nu}}\,\Omega^{3/2} r g', \quad j_\psi = \sqrt{\frac{\rho}{4\pi\nu}}\,\Omega^{3/2} r f', \quad j_z = \sqrt{\frac{\rho}{\pi}}\,\Omega g \tag{4.2}$$

$$E_r = \sqrt{4\pi\rho\nu}\,\Omega^{3/2}(r - kg' + wg - vh), \quad E_\psi = 0$$

$$E_z = \sqrt{4\pi\rho}\,\Omega^2 r^2 (vf - ug) + 2k\sqrt{4\pi\rho}\,\Omega\nu g \tag{4.3}$$

There are 3 references: 1 Soviet, 1 German and 1 English.

SUBMITTED: July 14, 1960

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AUTHOR: Sychev, V. V.

TITLE: Hypersonic Flow Around Thin Bodies at Large Angles of Incidence

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 131, Nr 4, pp 776-779 (USSR)

TEXT: In the present paper the author generalizes the theory of small perturbations to the flow around thin bodies at large angles of incidence. The results obtained furnish the generalized law of plane cross sections and the similarity principle for the flow of a gas around such bodies the length of which is much greater than their transverse dimensions. The author investigates a thin or extended body which is located in a uniform supersonic flow at the angle of incidence α. The author assumes that $\delta = d/l \ll 1$, where l denotes the length of the body and d its largest transverse dimension. The number M_∞ of the undisturbed flow is assumed to be considerably greater than unity. It holds that $M_\infty \delta \sim 1$ or $M_\infty \delta \gg 1$. The author investigates the flow in a narrow region adjoining the surface of a body. Here, the transverse dimensions of this region and the body are of the same order of magnitude. In the case of small angles of incidence ($\alpha \sim \delta$) the whole field of flow extending between the shock wave and the body may be enclosed by the afore-mentioned region, whereas

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in the case of large angles of incidence only the slightly disturbed part of flow is located outside this region. This part has no influence on the rest of the field of flow. Also in the case of large angles of incidence the problem of flow is reduced to the study of hypersonic flow around thin bodies in the immediate neighborhood of the body. It is therefore possible to investigate this neighborhood approximately also in an analytical manner. First, the corresponding system of differential equations of gas dynamics is written down in dimensionless coordinates, after which the boundary conditions are studied. The resulting relations are simplified by using the above-mentioned relations $\delta = d/l \ll 1$ and $M_\infty \delta \sim 1$ or $M_\infty \delta \gg 1$. By integrating the approximate system of equations one obtains the solution of the problem under discussion. By formal substitution of the time variable $t = z/V_\infty \cos\alpha$ for the independent variable z one obtains a system of differential equations and boundary conditions the solution of which corresponds to a nonsteady motion of a gas in the plane z = const. This gas motion is caused by the motion of an expanding and shifting piston. In the case under consideration the following similarity principle holds: Flows around bodies with similar distribution of the areas and shapes of their cross sections are similar. The afore-mentioned

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simplified system of equations contains a small parameter, k_δ, with large α, and integration is possible in this case by the use of successive approximations. Here, the zeroth approximation is reduced to the exact solution of the problem of a hypersonic flow with $M_{n\infty} = M_\infty \sin\alpha$ around plane contours of the cross sections of the body. Further iterations lead to linear equations. The solution of the approximate system of equations under the pertinent boundary conditions does not depend on M_∞ at large angles of incidence ($\alpha \sim 1$). This explains the fact that in the case of large angles of incidence the aerodynamic properties of thin bodies attain the hypersonic limit much faster than in the case of small angles of incidence. There are 4 references, 1 of which is Soviet.

PRESENTED: August 6, 1959, by A. A. Dorodnitsyn, Academician

SUBMITTED: July 31, 1959

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number). From the obtained solution it is evident that the disturbed flow is divided from the undisturbed flow by a front which coincides with the x-axis (by appropriate choice of integration constant). In the general case (arbitrary positive n), the solutions in the neighborhood of the front are singular. It is worthwhile comparing these results with analogous behavior of solutions in the non-linear theory of heat conductivity in an unbounded medium with initial zero temperature. On cavity (wake) flow, it is stated that the plane flow past a finite body is considered, with linear temperature dependence of viscosity. It follows from the pertinent equations that the shock-wave flow at great distance from the body is entirely equivalent to the one-dimensional unsteady flow in the neighborhood of the front. (The inclination τ is considered small for large x, (see Fig. 3)). By considering the flow inside the wake, this equivalence is found to apply to the entire cavity flow. This means that at great distances from a body which moves at hypersonic velocity in a viscous conducting gas, the same law of plane sections applies as in the case of a non-viscous, non-conducting gas; thereby the flow in the central part of the wake (near the x-

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axis) is mainly affected by the heat conductivity of the gas; this does not imply that viscosity can be neglected, as it is largely responsible for the longitudinal velocity-component. On the aerodynamic resistance of body, the author states that the energy per unit area is set equal to the sum of the aerodynamic resistance X and the heat flow Q through it per unit time: $E = X + Q$. On the other hand, the energy of the unsteady flow can be expressed as an integral of kinetic energy. It is noted that the nature of the cavity flow is entirely independent of the nature of aerodynamic resistance, (i.e. of it being the result or pressure or friction). The law of similitude for flows with different values of E is set up. In accordance with this law, the width of the disturbed region and the velocity are proportional to $E^{1/3}$, whereas the pressure and temperature - to $E^{2/3}$. Two types of a self-simulating (progressive) flow are considered: a) Gas flow under the effect of a plate at constant acceleration; and b) Gas flow under the effect of rotation of axisymmetric conical surfaces. It follows from the equations obtained for b) that the dividing front is cone-shaped with the apex coinciding with that of the rotating surface, and that the

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velocity components along rays proceeding from the origin are proportional to distance, and the pressure and enthalpy - to square of distance, whereas the density remains constant. It is concluded that the solution of the equations relating to flow at $M_\infty \to \infty$, in the neighborhood of the dividing front, can be easily found; thereby the surface element of the front can be considered as plane, and its normal velocity as constant for small time intervals. The reduction of the problem to a boundary-value problem in finite space facilitates its solution by approximate methods. There are 6 figures and 9 references: 4 Soviet-bloc and 5 non-Soviet-bloc. The references to the English-language publications read as follows: W.D. Hayes and R.F. Probstein, Hypersonic flow theory. Academic Press, 1959, N.Y.; W.D. Hayes and R.F. Probstein, Viscous hypersonic similitude. Jour. Aero/Space Sci., 1959, no. 12; H.S. Tsien, Superaerodynamics, K. Aero. Sci., 1946, no. 12.

SUBMITTED: April 6, 1961

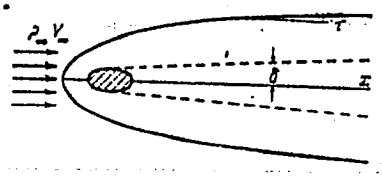

Fig. 3

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ZENGER-BREDT, I.[Sanger-Bredt, I.]; SYCHEV, V.V.[translator]; ASINOVSKIY, E.I.[translator]; KIRILLIN, V.A., red.; SHEYNDLIN, A.Ye., doktor tekhn. nauk, prof., red.; YAKIMOVICH, M.G., red.; KARPOV, I.I., tekhn. red.; KOROTEYEVA, Yu.I., tekhn. red.

[Some properties of hydrogen and water as possible working fluids for rockets]Nekotorye svoistva vodoroda i vodianogo para - vozmozhnykh rabochikh tel raket. Moskva, Izd-vo inostr. lit-ry, 1962. 98 p. Translated from the English and the German. (MIRA 16:1)

1. Chlen-korrespondent Akademii nauk SSSR (for Kirillin).
(Rockets (Aeronautics))

SYCHEV, V.V. (Moskva)

Use of the method of minor perturbations in problems involving a hypersonic gas flow past slender blunt-nosed bodies. PMTF no.6: 50-59 N-D '62. (MIRA 16:6)

(Aerodynamics, Hypersonic)

SYCHEV, V. V.

"Hypersonic Flow Past Blunted Slender Bodies of Noncircular Section". Is extending Ladyzhenskii's hypersonic area rule to include entropy layer due to slight blunting.

report submitted for the 6th Symposium of Advanced Problems in Fluid Mechanics, Zakopane, Poland, 2-6 Sept 1963.

All papers will be published in a 1964 issue of the Polish Journal of Applied Mechanics, Archiwum mechanika Stosowanej.

SYCHEV, V. V.

"Strong interaction between hypersonic boundary layer flow and inviscid flow."

report presented at the 4th Intl Cong, Intl Council of Aeronautical Sciences, 24-28 Aug 64.

Hd, Hypersonic Dept, Inst of Mechanics, Moscow.

...(m)/EPF(c)/ENG(v)/EPR/ENP(j)/FCS(k) Pc-4/
...ASD(f)/AEDC(a)/ASD(p)-3/
P/0033 64/016/002/0517/0519

AUTHOR: Sy*chev, V. V.

TITLE: Entropy effects in three-dimensional hypersonic flows over ... bodies

...mechanics and Astronautics, v. 16, no. 2, 1964, 517-519

TOPIC TAGS: hypersonic flow, blunt body, three dimensional hypersonic flow, entropy effect, entropy layer, hypersonic area rule

ABSTRACT: The asymptotic effect of slight nose bluntness on hypersonic flow over nonaxisymmetrical bodies or bodies of revolution ...ing at an angle of attack is considered at distances far larger ...than the characteristic dimension of bluntness. The presence at sufficiently large distances from a blunt nose of large transverse ...components of the azimuthal component of the velocity vector near the ...surface is theoretically substantiated. The necessity for ...precise knowledge of the transverse entropy effect in calculations ...the gas parameters of the flow is stressed. A comparison is made with the results obtained by Sadyrbenskiy (Hypersonic area rule.

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001654220014-6"